

REMARKS

Claims 1-8 and 21-29 along with newly added claims 30-34 are currently pending in the present patent application. Claim 20 has been cancelled in the above claim amendments and claims 21-29 have been allowed by the Examiner. Claims 21 and 28 have been amended to correct a minor inconsistency in one term recited in each of these claims. These amendments do not narrow or change in any way the scopes of these claims and the claims remain allowable.

In an Office Action mailed July 21, 2004, the Examiner rejected claims 1-7 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,744,173 to Behin *et al.* ("Behin") and rejected claim 8 as being obvious under 35 U.S.C. § 103(a) over Behin in view of U.S. Patent No. 6,744,173 to Rice ("Rice"). Note that the Office Action indicates claim 8 is rejected under Section 102 over Behin, but this appears to be an error since no rationale is set forth in the Office Action regarding this rejection. Moreover, in the rejection of claim 8 under Section 103 the Examiner states "Behin discloses 'all [of] the invention except for a bonding structure' and points to Rice for teaching this element of the claim. Thus, in the following remarks it is assumed claim 8 is rejected under Section 103 only.

Claim 1 recites a micromachined device including a semiconductor body, an intermediate layer on top of the semiconductor body, and a substrate of semiconductor material, on top of the intermediate layer. A cavity extends in the intermediate layer, the cavity delimiting laterally bottom fixed regions and being delimited at the top by the substrate and at the bottom by the semiconductor body. An oscillating element is formed in the substrate above the cavity and trenches extend through the substrate, the trenches insulating the oscillating element from top fixed regions. The oscillating element comprises an oscillating platform and mobile electrodes extending towards the top fixed regions and the bottom fixed regions form fixed electrodes that extend in the intermediate layer towards the inside of the cavity and are staggered with respect to the mobile electrodes.

In the embodiment of the present invention shown in Figure 11, the semiconductor body 16, intermediate layer 8, and substrate 2 on top of the intermediate layer are shown. The cavity 9 in the intermediate layer delimits laterally bottom fixed regions 12a and 12b and is delimited at the top by the substrate 2 and

at the bottom by the semiconductor body 16. The oscillating element 34 is shown in Figure 9 and is formed in the substrate 2 above the cavity 9, with trenches 23 insulate the oscillating element 34 from top fixed regions 28a and 28b. The oscillating element 34 includes an oscillating platform 30 shown in Figure 11 and includes mobile electrodes 33a and 33b (Figure 9) extending towards the top fixed regions 28a and 28b. The bottom fixed regions 12a and 12b form fixed electrodes 13a and 13b (Figure 9) that extend in the intermediate layer 8 towards the inside of the cavity 9 and are staggered with respect to the mobile electrodes 33a and 33b.

The Behin patent discloses a multi-layer vertical comb-drive actuator 10 shown in Figures 1. The Examiner states that the intermediate layer recited in claim 1 corresponds to layer 210 shown in Figure 2E and also states that the substrate of semiconductor material recited in claim 1 corresponds to layer 208. The recited semiconductor body is said to correspond to layer 206 in Figure 2E. While the Behin patent does disclose an actuator, the structure of this actuator is very different from the structure of the device recited in claim 1.

First, if layer 210 is the intermediate layer of claim 1 then Figure 2E clearly shows that the cavity in this intermediate layer is not delimited at the top by the substrate 208 and at the bottom by the semiconductor body 206. Also, Behin does not disclose the recited bottom fixed regions in the intermediate layer that form fixed electrodes extending in the intermediate layer towards the inside of the cavity and that are staggered with respect to the mobile electrodes. The bottom fixed regions in Behin delimited by the cavity do not form fixed electrodes as recited and as seen in Figure 2E of Behin. Also, although the substrate of claim 1 is said to correspond to layer 208, the layer 208 in Behin is an insulating layer. See column 10, lines 42-43.

For these reasons, the Behin patent neither discloses nor suggests the device recited in claim 1. The combination of elements recited in claim 1 is therefore allowable. Dependent claims 2-8, which ultimately depend from claim 1, are allowable for the same reasons as claim 1 and due to the additional limitations added by these claims. For example, with regard to claim 3 if the intermediate layer is layer 210 then there is no insulating layer between the intermediate layer and the substrate 208 since layer 204 disposed between these layers is instead a conductive layer. See column 10, lines 41-43.

Newly added claim 30 recites a micromachined device including, in part, an intermediate layer adjacent the first substrate. The intermediate layer has fixed electrode regions formed in the layer with these electrode regions being spaced apart in the intermediate layer to define a cavity among the regions. The electrode regions include portions extending into the cavity. A second substrate adjacent the intermediate layer includes movable electrodes formed in the second substrate. The movable electrodes include portions extending into the cavity with the portions being offset relative to the fixed electrode regions.

Neither Behin nor Rice, whether taken individually or in combination, disclose or suggest a device where the fixed electrode regions are formed in an intermediate layer and where the movable electrode regions are formed a substrate. In contrast, Behin discloses fixed electrodes formed in both the substrate and what the Examiner has termed the intermediate layer as shown in Figure 2E. The combination of elements recited in new claim 30 is therefore allowable, and dependent claim 31 is allowable for at least the same reasons as claim 30.

New claim 32 recites, in part, a device including an intermediate layer adjacent the first substrate. The intermediate layer has fixed electrodes formed in the layer with these electrodes being spaced apart in the intermediate layer to define a cavity among the electrodes. A second substrate is adjacent the intermediate layer and includes movable electrodes formed in the second substrate. The movable electrodes are not positioned opposing the fixed electrodes in an at rest condition of the device.

In contrast to the device of claim 32, the device of Behin as shown in Figure 1A, for example, clearly shows that the mobile and fixed electrodes are positioned "facing" or opposing one another in an at rest condition. The "at rest condition" is a condition when no signal is applied to the fixed and movable electrodes to cause the movable electrodes to rotate relative to the fixed electrodes. The combination of elements recited in new claim 32 is therefore allowable, and dependent claims 33 and 34 are allowable for at least the same reasons as claim 32.

The present patent application is in condition for allowance. Favorable consideration and a Notice of Allowance are respectfully requested. Should the Examiner have any further questions about the application, Applicant respectfully requests the Examiner to contact the undersigned attorney at (425) 455-5575 to

resolve the matter. If any need for any fee in addition to that paid with this response is found, for any reason or at any point during the prosecution of this application, kindly consider this a petition therefore and charge any necessary fees to Deposit Account 07-1897.



Respectfully submitted,

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